

CLAIMS

1. A substituted polyaniline polymer capable of converting between a self-doped form and a non-self doped form by a reversible chemical reaction.

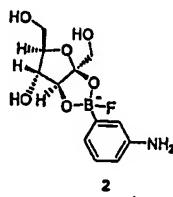
5        2. The polymer according to claim 1 having a hardness of at least 0.03 GPa.

3. The polymer according to claim 1 having a molecular weight of at least 10,000.

4. The polymer according to claim 1 having a molecular weight of  
10 at least 100,000.

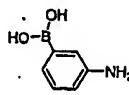
5. A polymer capable of converting between a self-doped form and a non-self doped form by a reversible chemical reaction.

6. A self-doped polyaniline capable of converting between:  
a water-soluble self-doped form comprising repeating units as shown  
15 below



20 ; and

a water-insoluble non-self-doped form comprising repeating units as shown below:



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wherein the water-soluble form is converted to the water-insoluble  
 5 form by reducing fluoride concentration of the polymer.

7. The polyaniline according to claim 6 having a hardness of at least 0.03 GPa.

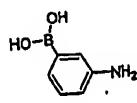
8. The polyaniline according to claim 6 having a molecular weight of at least 10,000.

10 9. The polyaniline according to claim 6 having a molecular weight of at least 100,000.

10. A method of making a self-doped polyaniline comprising:

(a) providing a monomer:

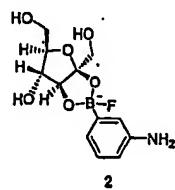
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D-fructose and fluoride;

(b) incubating said monomer, the D-fructose and the fluoride under  
 20 conditions suitable for polymerization, thereby producing a first polymer:

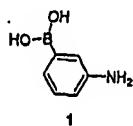


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(c) precipitating said polymer by reducing the fluoride concentration, thereby producing a second polymer:

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11. The method according to claim 10 including:
  - (d) heating the second polymer, thereby forming a cross-linked polymer.
- 10 12. The method according to claim 10 having a hardness of at least 0.03 GPa.
13. The method according to claim 10 having a molecular weight of at least 10,000.
14. The method according to claim 10 having a molecular weight 15 of at least 100,000.